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THE EFFECTS OF BLOCKING MOUTHING OF LEISURE ITEMS ON THEIR EFFECTIVENESS AS REINFORCERS

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Leisure items are commonly used as reinforcers in behavior-analytic applications. However, a defining feature of autism is the occurrence of stereotypy, and individuals with autism often engage leisure items in a stereotyped manner. The opportunity for stereotyped interaction may be the only aspect of a contingent stimulus that makes it a reinforcer for appropriate behavior. Therefore, this study investigated the effects of blocking stereotyped reinforcer interaction on reinforcer efficacy for 2 children with autism. Results showed that blocking stereotypic reinforcer interaction did not influence reinforcer efficacy.

DESCRIPTORS: autism, object mouthing, reinforcer assessment, response blocking, stereotypy

Leisure items are often delivered contingent on appropriate behavior in applied research and practice and are often effective reinforcers (DeLeon, Iwata, & Roscoe, 1997). However, a defining feature of autism is the occurrence of stereotypy (American Psychiatric Association, 2000), and individuals with autism often engage leisure items in a stereotyped manner. Given that decreasing stereotypy is a clinical goal of behavioral intervention for individuals with autism, delivering leisure items as reinforcers for appropriate behavior may actually be setting the occasion for the occurrence of stereotypy, thereby constituting a conflict between the goals of increasing appropriate behavior and simultaneously decreasing stereotypy. Therefore, it may be useful to develop a procedure for effectively delivering leisure items as reinforcers while simultaneously preventing or decreasing stereotyped interaction with those items.

Stereotypy often appears to be automatically maintained (Hanley, Iwata, & McCord, 2003), and response blocking has been shown to be effective for reducing stereotypy (Reid, Parsons, Phillips, & Green, 1993). One potential procedure for decreasing stereotyped reinforcer interaction would therefore be to block such interaction. However, a possible limitation is that it may eliminate the reinforcing function of the stimulus with which stereotyped interaction is blocked. That is, the opportunity for stereotyped interaction with the reinforcer may be the only aspect of the stimulus that makes it a reinforcer for appropriate behavior. Therefore, the purpose of this study was to investigate the effects of blocking stereotyped reinforcer interaction on reinforcer efficacy.

METHOD

Participants and Setting

Two boys who had been diagnosed with autism participated. Sam was a 4-year-old boy

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with little or no apparent receptive or expressive language skills. Sam engaged in multiple topographies of stereotypy but, given the potential health risks involved, his parents were primarily concerned with object mouthing. Seth was a 5-year-old boy who attended an intensive behavioral intervention preschool program for children with autism. Seth engaged in high rates of object mouthing and little or no other stereotypy. Seth required limited assistance with his daily living skills and demonstrated minimal receptive and expressive communication skills. All sessions were conducted in a room (2.5 m by 2.5 m) with a table and two chairs. A functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) was conducted on the object mouthing of both participants prior to the current investigation. Object mouthing occurred at undifferentiated rates across conditions, suggesting that it was maintained by automatic reinforcement (data available from the first author).

Response Measurement and Interobserver Agreement

Data were collected using a handheld computer that was equipped with the !Observe© data-collection program. *Object mouthing* was defined as insertion of an object past the plane of the lips, including attempts to do so. *Toy contact* was defined as the child's hand in contact with any part of the toy for at least 1 s. Maintenance responses were selected based on caregiver report that the children had engaged in them previously. The maintenance response for Sam consisted of depressing a microswitch button that activated the digitally recorded statement "Koosh® ball please," and the maintenance response for Seth consisted of the fine-motor activity of stringing beads. Toy contact and object mouthing were measured using a 10-s partial-interval recording system. Frequency data were collected on the maintenance responses in continuous 10-s intervals during the reinforcer assessment.

Interobserver agreement was assessed by having a second observer simultaneously but independently collect data during 40% of reinforcer assessment sessions. Agreement for toy contact and object mouthing was calculated by dividing the number of 10-s intervals with agreement by the total number of intervals and multiplying by 100%, yielding a mean of 99% for object mouthing (range, 94% to 100%) and a mean of 99% for toy contact (range, 98% to 100%). Agreement for maintenance responses was calculated per 10-s interval by dividing the smaller frequency by the larger frequency and multiplying by 100%, yielding a mean agreement of 100%.

Preference Assessment

Leisure items were assessed to determine which items to include as potential reinforcers in the subsequent reinforcer assessment. Items were assessed by interviewing caregivers (Fisher, Piazza, Bowman, & Amari, 1996), followed by a duration-based preference assessment (DeLeon, Iwata, Conners, & Wallace, 1999) that included the top seven items identified during caregiver interviews. The most preferred items, a Koosh® ball for Sam and an eye balls toy for Seth, were chosen for inclusion in the reinforcer assessment. Data were not collected on object mouthing during the preference assessment, but anecdotal observations suggested that both participants mouthed most assessment items most of the time.

Reinforcer Assessment

An ABACACAB reversal design was used to evaluate the effects of blocking stereotypic mouthing of leisure reinforcers on leisure reinforcer efficacy. All sessions were 10 min in duration and were conducted three to five times daily, 2 to 3 days per week. Prior to each session, the participant was instructed to engage in the maintenance response with a verbal instruction and an experimenter model of the correct response. At the onset of each session, the materials required to engage in the

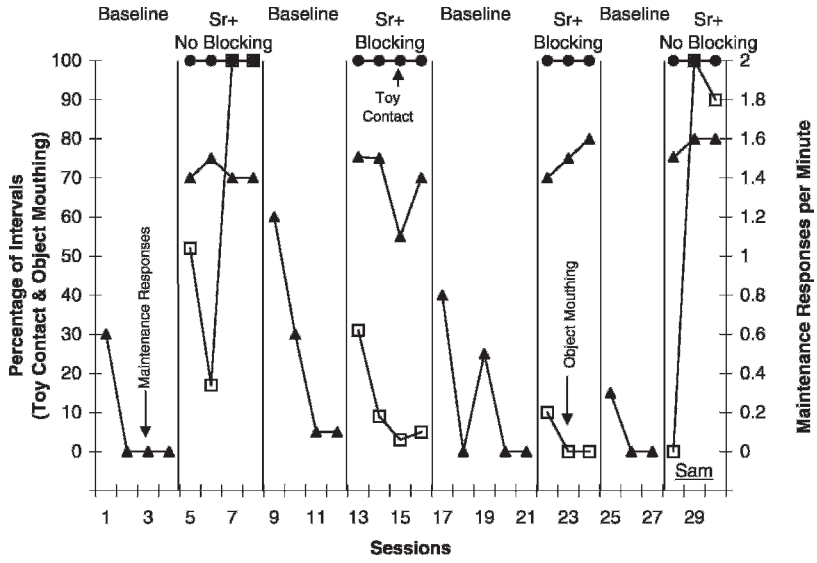

Figure 1. Maintenance responses per minute (right) and the percentage of intervals with object mouthing and toy contact (left) for Sam during his reinforcer assessment.

maintenance response were presented on the table in front of the participant. During all phases, these materials were removed for 30 s contingent on the occurrence of the maintenance response (to equate the amount of time participant would have the opportunity to engage in the maintenance response across all conditions).

During baseline, there were no additional programmed consequences for any behavior. The purpose of this condition was to assess the extent to which the maintenance response persisted without socially mediated consequences. During the no-blocking condition, the participant gained access to his leisure item for 30 s. After the 30-s interval, the leisure item was removed and the maintenance task materials were returned. The purpose of this condition was to assess the extent to which contingent delivery of the leisure item reinforced the maintenance response. During the blocking condition, all procedures were identical to the no-blocking condition except that all stereotypic object mouthing was physically blocked. Blocking consisted of the experimenter placing his or her hand between the participant's mouth and the item. The purpose of the blocking condition was to assess the extent to which the leisure items continued to function as reinforcers for maintenance responses when item mouthing was blocked.

RESULTS AND DISCUSSION

During the reinforcer assessment, Sam displayed low rates of the maintenance response during baseline sessions (M = 0.2 responses per minute) (Figure 1). During the initial no-blocking condition, Sam displayed high rates of the maintenance response (M = 1.4 responses per minute) and high levels of both toy contact (M = 100%) and object mouthing (M = 67%). During the return to baseline, near-baseline rates of maintenance task responding were observed (M = 0.5). During the blocking condition, he continued to engage in high rates of the maintenance response (M = 1.4), his level of object mouthing decreased (M = 12%), and his level of toy contact remained high (M = 100%). This general pattern of responding was replicated when all conditions were repeated.

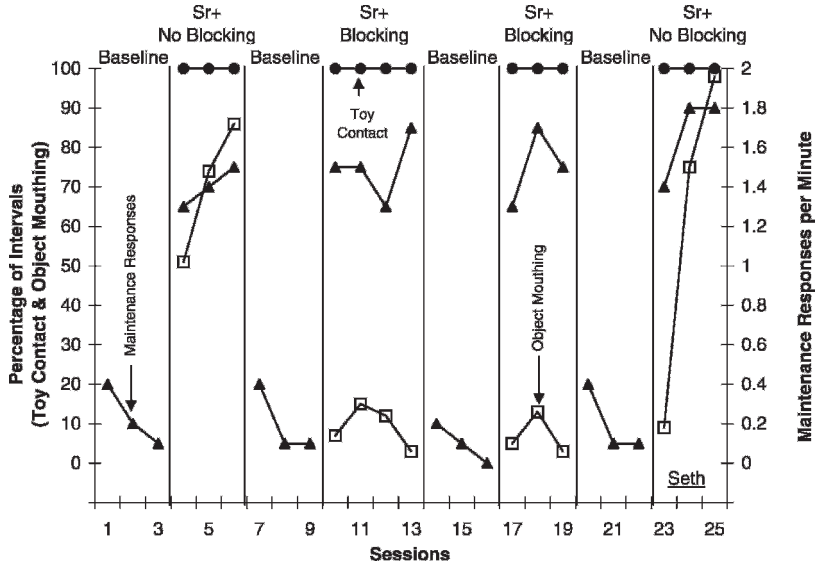

Figure 2. Maintenance responses per minute (right) and the percentage of intervals with object mouthing and toy contact (left) for Seth during his reinforcer assessment.

Results of Seth's reinforcer assessment (Figure 2) were similar to those obtained with Sam. Seth engaged in low rates of the maintenance response during baseline (M = 0.2 responses per minute). During the initial no-blocking condition, he displayed high rates of the maintenance response (M = 1.4) and high levels of both object mouthing (M = 70%) and toy contact (M = 100%). When baseline was reintroduced, baseline rates of maintenance responding were recovered (M = 0.2). During the blocking condition, Seth continued to display high rates of the maintenance response (M = 1.5), levels of object mouthing decreased (M = 9%), and toy contact remained high (M = 100%). This general pattern of responding was replicated when all conditions were repeated.

Blocking stereotypic reinforcer interaction decreased stereotypy for both participants and appeared to have no effect on reinforcer efficacy or toy contact for both participants. These results suggest that maladaptive stereotypic reinforcer interaction may be interrupted without diminishing the ability of the object to serve as a reinforcer, at least with these 2 participants.

Early research on the relation between stereotypy and appropriate play behavior demonstrated that reductions in stereotypy (via punishment) do not generalize to reductions in appropriate play, and may actually have the opposite effect (i.e., play increases when stereotypy is reduced; Koegel, Firestone, Kramme, & Dunlap, 1974). Similarly, early research on the relation between stereotypy and the acquisition of successive discriminations demonstrated that discrimination learning was facilitated by reducing stereotypy via punishment (Koegel & Covert, 1972). The current study extended these findings by demonstrating that suppression of stereotypy that occurs with items used as reinforcers in teaching programs does not diminish the reinforcing efficacy of these items.

Negative side effects of positive reinforcers have been described by Balsam and Bondy (1983) as well as others. For instance, Piazza, Fisher, Hanley, Hilker, and Derby (1996) showed that rates of automatically reinforced self-injury (SIB) increased when preferred stimuli were delivered in differential reinforcement programs. The authors hypothesized that

delivering such stimuli may set the occasion for SIB. The children in our study also engaged in high levels of undesirable stereotypy with the items used in our reinforcement-based program. Our study extends this area by showing that this particular negative side effect of reinforcement can be addressed without diminishing the positive direct effects of the program.

A significant limitation of the current study was that only one measure of item interaction (other than stereotypy) was included. Reducing stereotyped item interaction may increase appropriate behavior or alternatively increase other stereotyped topographies of item interaction. However, the broad scope of the definition of item interaction used in the current study (i.e., hand contact with item for at least 1 s) did not allow measurement of specific topographies of nonmouthing item interaction. Anecdotal observations suggested that participants often interacted with leisure items in socially appropriate ways during the blocking condition, but this observation should be confirmed with direct measures in future research.

An additional limitation is the brevity of the blocking phases. It is possible that decreases in reinforcer effectiveness would have been observed if the duration of the blocking condition had been increased. That is, if the sensory consequence of mouthing leisure items was the feature of the leisure item that made it a reinforcer for maintenance responding, then extended response blocking (a possible occurrence in a classroom setting) might have produced decrements in the reinforcing effects of the leisure items. Future research should implement extended blocking phases to examine this possibility.

In summary, the current investigation used leisure items as reinforcers for children with autism while simultaneously preventing the occurrence of stereotyped interaction with the leisure items via response blocking. Results demonstrated that reinforcer effectiveness was not altered as a function of response blocking. If replicated further, this procedure may prove to be an effective means of using leisure items as reinforcers while preventing the occurrence of stereotypy, which is often a clinical priority for individuals with autism.

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